

THE STRUCTURE AND RELATIONSHIPS OF
STEFANOMIOPTERA GUTHÖRL
(MIOMOPTERA-PALAEOMANTEIDAE)¹

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During the past 80 years the Upper Carboniferous strata of the Saar Basin in Germany have yielded many interesting and important insects. Most of these have been described by Dr. Paul Guthörl of Bildstock (Saar) over a period of nearly thirty years, from 1934 until his death in 1963. Among the last of the fossils which he described were two species belonging to the order Miomoptera — an extinct group which seems to have been related to the Protorthoptera and possibly to the Psocoptera. The order is known mainly from Permian deposits (Kukalová, 1963) but three species described by Guthörl have been found in the Upper Carboniferous beds of the Saar Basin.² One of these, *Archaeomioptera carbonaria* Guthörl, which was placed in a separate family (Archaeomiopteridae), is distinguished by the oval shape of the hind wing and minor venational features. The other two species, *Stefanomioptera hangardi* (type-species of the genus) and *S. ostertali*, were described as having certain venational structures (such as the origin of the media from the radial sector) which are not characteristic of the order and which would actually eliminate the insects from that taxon. Further study of the fossils seemed to me to be necessary, especially in view of their geological age. Both specimens were originally part of Dr. Guthörl's personal collection but were eventually located by Dr. Dora Wolansky in the Geologisches Institut der Universität des Saarlandes. I am grateful to Dr. Wolansky and to Professor Dr. F. Firtion of the Institut for making possible my study of these two interesting fossils.

For reason given below I am now convinced that the peculiarities which Guthörl attributed to the insects are not actually present in the specimens, that the species are typical Miomoptera and that the

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²Another species, *Metropator pusillus* Handlirsch, from the lower part of Pennsylvanian period (Upper Carboniferous) apparently belongs to this order. See Carpenter, 1965, p. 175.

genus is a synonym of *Palaeomantis*. New descriptions and figures of these fossils are included here.

Family Palaeomanteidae Handlirsch

Genus *Palaeomantis* Handlirsch

Palaeomantis Handlirsch, 1904, Mem. Acad. Sci. Petersb., 16: 4.

[Synonyms: *Delopterus* Sellards, 1909; *Pseudomantis* Martynov, 1928; *Leptoncurula* Martynov; *Pseudodelopterus* Martynov; *Delopsocus* Tillyard; *Miomantisca* Zalesky, 1956; *Delopteriella* Zalesky, 1956; *Miomatoncurites* Zalesky, 1956; *Stefanomioptera* Guthörl, 1962 (new synonymy).]

This genus has now been found in Permian deposits in the United States, Czechoslovakia, and the Soviet Union. The two following species are the only Upper Carboniferous ones known in the genus or family.

Palaeomantis hangardi (Guthörl)

Stefanomioptera hangardi Guthörl, 1962, Palaeont. Zeitschrift, Schmidt Festband: 69, fig. 3; plate 6, figs. 1a-d.

Fore wing: length, 6.3 mm., width, 2.0 mm. Sc terminating before the middle of the wing and bearing a distinct fork distally; R₁ with an oblique distal veinlet; R_s with three terminal branches, R₂, R₃, R₄ + 5; M arising as usual from CuA at about the level of the origin of R_s, with a deep fork, both branches apparently simple; anterior branch of CuA with a distal veinlet directed to the hind margin; CuP straight. The wing is uniformly covered with fine hairs.

Holotype: No. 1 in the Guthörl Collection, Geol. Inst. Univ. Saarlandes. Collected in Upper Carboniferous beds (Stephanian A), near Neunkirchen, Germany. This is a complete and well preserved fore wing.

In his drawing of this specimen, Guthörl showed M arising from R_s and he designated that as the basis of the genus *Stefanomioptera*. However, the origin of M from CuA, as in all other known Miomoptera, can be distinctly seen in the type specimen, especially when the surface of the specimen has been moistened with water or alcohol. Guthörl's drawing also missed completely all of CuP; this is usually a weak vein in the Miomoptera and can easily be overlooked; application of alcohol to the specimen brings this vein out clearly. With these corrections made, *S. hangardi* is a typical *Palaeomantis*, differing from other species in the minor details of branching and wing shape.

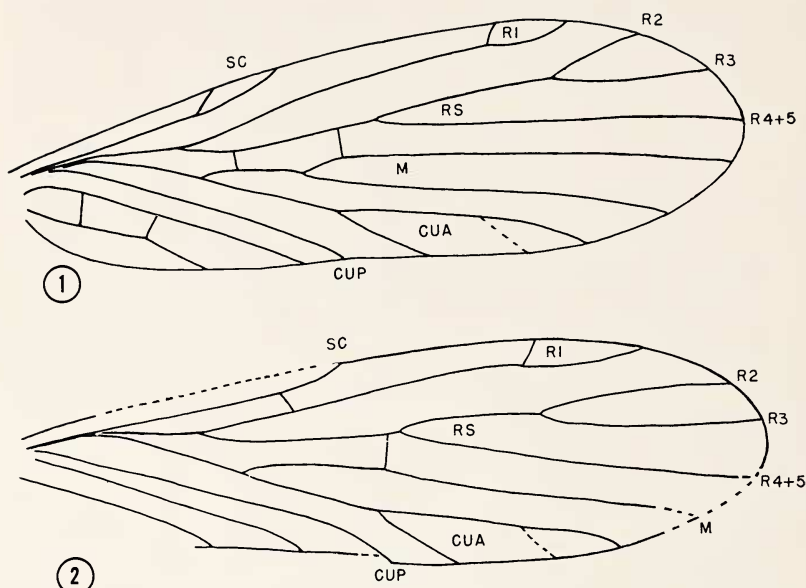


Figure 1. *Palaeomantis hangardi* (Guthörl), from Saar Basin (Upper Carboniferous), Germany; original drawing, based on the type specimen. Length of wing 6.3 mm.

Figure 2. *Palaeomantis ostertali* (Guthörl), from the Saar Basin, Germany; original drawing based on the type specimen. Length of wing, 7.2 mm.

Palaeomantis ostertali (Guthörl)

Stefanomioptera ostertali Guthörl, 1962, Palaeont. Zeitschrift, Schmidt Festband: 69, fig. 4; plate 7, figs. 1a-c.

Fore wing: length, 7.2 mm., width 2.0 mm. The wing is slightly distorted along the posterior margin, just basal of the end of CuP and the anterior margin is missing near the base. Sc, R₁ and R_s are formed much as in *S. hangardi*; M arises from CuA, as is typical of the Miomoptera but appears to be without a branch or fork. CuP is straight, as in *hangardi*. This wing is also covered with fine hairs.

Holotype: No. 2 in the Guthörl Collection, Geol. Inst. Univ. Saarlandes. Collected in Upper Carboniferous strata near Neunkirchen, Germany. This is a nearly complete wing, slightly torn along the posterior margin.

Guthörl's drawing shows a small distal fork on M; however, the membrane in that region is broken away and does not, in my opinion, show a fork. In any event, M is unbranched at least until near the wing margin. M does not arise from R_s, as described by Guthörl,

but is derived from CuA, as in other *Miomoptera*. This can be seen by wetting the surface of the fossil. I do not, however, see the distal fork which Guthörl shows on R₄+5; it is also in the part of the wing which is broken away.

This species may be the same as *hangardi*, but since it has been described and named by Guthörl, retention of it as a distinct species seems advisable until more is known about the variation within these Carboniferous *Miomoptera*.

The occurrence of these palaeomanteids, of small size and with reduced wing venation, in Upper Carboniferous strata is unexpected and truly remarkable. On the basis of their wings, they seem to be very much like the Permian forms. Indeed, so far as the wings are concerned, the *Miomoptera* as a whole form a very homogenous group. The body structures, which are known only in *Palaeomantis*, appear generalized and are not especially suggestive of close relationship to any living order; however, the presence of distinct, though small, cerci (Carpenter, 1939) is indicative of orthopteroid affinities.

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